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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/960,316	09/24/2001	Tsuyoshi Shibata	04329.2675	5345

7590

07/08/2003

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Washington, DC 20005-3315

EXAMINER

AHMED, SHAMIM

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 07/08/2003

7

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/960,316

Applicant(s)

SHIBATA, TSUYOSHI

Examiner

Shamim Ahmed

Art Unit

1765

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 06 May 2003.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 2-4, 6, 9, 10, 12-14, 16, 19 and 21-23 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.

- 6) ☒ Claim(s) 2-4, 6, 9, 10, 12-14, 16, 19 and 21-23 is/are rejected.

- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.

- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.

- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All b) ☐ Some \* c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)

- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_.

- 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_.

- 5) ☐ Notice of Informal Patent Application (PTO-152)

- 6) ☐ Other: \_\_\_\_\_.

## **DETAILED ACTION**

### ***Drawings***

1. The corrected or substitute drawings were received on 5/6/03. These drawings are acceptable.

### ***Response to Amendment***

2. The amendment filed on 5/6/03 is sufficient to overcome the 102(a) rejection as being anticipated by Yasuda et al (JP-411283910).

Accordingly, the rejection under 35 USC 102(a) of the previous office action is withdrawn.

### ***Response to Arguments***

3. Applicant's arguments with respect to claims 1-20 have been considered but are moot in view of the new ground(s) of rejection.

Applicant argues that Yoko (JP-7-135140) fails to teach "forming a covering layer containing silicon or metal on the upper resist pattern by a coating method using a solution containing water as a solvent which is incapable of dissolving the upper resist pattern".

This is not persuasive because Yoko's SOG covering layer is coated by spin-coating process and SOG inherently contains water as a solvent as supported by Forester et al (USP 5,871,383).

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Applicant also argues that Yoko does not teach etching upper resist pattern and the lower resist film using the remaining covering layer as a mask.

This is not persuasive because Yoko discloses that the upper resist is etched to form patterns and the lower resist film is etched to form lower resist patterns using the remaining covering layer (8) as an etching mask (see figures 2a -2i).

***Claim Rejections - 35 USC § 102***

4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

5. Claims 2-4, 6, 9, 21 and 23 are rejected under 35 U.S.C. 102(b) as being anticipated by Yoko (JP-7-135140) as evidence by Forester et al (5,952,243).

As to claims 2-4, 21 and 23, Yoko disclose a process of making resist pattern, wherein a resist pattern is formed over a semiconductor substrate and then a silicon containing polymer film such as silicon on glass (SOG) film is spin-coated on the resist pattern without dissolving the underlying resist (see abstract and paragraph 13).

Yoko also discloses that the covering layer composed of suitable solvent depending on the polymer material, wherein the solvent will not dissolve the under lying resist layer (see figure 3e).

Yoko inherently teaches that the SOG film contains water as a solvent during the coating process, which is supported by Forester et al.

Forester et al teach that SOG film contains water as a suitable solvent (col.3, lines 59-64).

As to claim 6, Yoko also inherently teach that the covering layer such as the SOG layer is heated or baked to remove residual solvent because the coating of the SOG is performed by spin coating and baking the coated layer is an inherent step in order to solidify the coating.

As to claim 9, Yoko teaches that the coated SOG film is etched back using a dry etching until a portion of the first resist pattern is exposed (see paragraph 12-15 of the translated version and figure 1(i)).

Yoko also teaches that etching the first and second resist pattern as the residual covering layer being used as a mask layer (paragraph 16-19 of the translated version).

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. Claims 10-14, 16, 19 and 22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Yoko (JP-7-135140) as evidenced by Forester et al (5,952,243) as applied to claims 2-4, 6, 9 and 21-23 above, and further in view of May et al (5,950,106).

Yoko teaches above in the paragraph 5 but fails to teach that the surface of the coated SOG film is wet etched.

However, in a method of forming patterns containing silicon-containing polymers, May et al teach that etching of a SOG layer can be performed preferable by dry etching but alternatively, can be done by wet etching (col.4, lines 25-28 and col.5, lines 40-48).

Therefore, it would have been obvious to one skilled in to Yoko's process because both the dry and wet etching are functionally equivalent for etching resist layer as taught by May et al.

As to claims 10 and 19, May et al teach that the wet etching is performed to etch or pattern the SOG using a diluted solution of nitric acid (col.5, lines 46-48).

As to claim 22, Yoko teaches that the covering the SOG film and etching processes are continuously performed in a suitable coating and etching apparatus (see the abstract).

As to claims 12-14, Yoko teaches that the covering layer is silicon containing such as silicon on glass (SOG) (see the abstract).

### **Conclusion**

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Levine et al (5,871,383) disclose that SOG contains water as solvent (col.5, lines 42-48).

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP


§ 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Shamim Ahmed whose telephone number is (703) 305-1929. The examiner can normally be reached on M-Thu (7:00-5:30) Every Friday Off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Benjamin Utech can be reached on (703) 308-3836. The fax phone numbers for the organization where this application or proceeding is assigned are (703)-872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.

  
BENJAMIN L. UTECH  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700

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Shamim Ahmed  
Examiner  
Art Unit 1765

SA  
July 3, 2003